

**SLOVENSKI STANDARD**  
**oSIST prEN 17106-4-1:2017**  
**01-maj-2017**

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**Obratovanje cestnih strojev - Varnost - 4-1. del: Stroji za vzdrževanje cest -  
Zahteve za stroje za rezanje grmičevja in košnjo trave**

Road operation machinery - Safety - Part 4-1: Road service area maintenance machines  
- Requirements for grass and brush cutting machines

Maschinen für den Straßenbetriebsdienst - Sicherheit - Teil 4-1: Maschinen für  
Straßenunterhaltung – Anforderungen für Grasmähgeräte

Machines d'exploitation des routes - Sécurité - Partie 4-1 : Machines d'entretien des  
accotements routiers - Exigences pour les faucheuses - débroussailleuses

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**Ta slovenski standard je istoveten z: prEN 17106-4-1**

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**ICS:**

43.160	Vozila za posebne namene	Special purpose vehicles
65.060.99	Drugi kmetijski stroji in oprema	Other agricultural machines and equipment

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 17106-4-1**

March 2017

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Will supersede EN 13019:2001+A1:2008, EN  
13021:2003+A1:2008, EN 13524:2003+A2:2014

English Version

## Road operation machinery - Safety - Part 4-1: Road service area maintenance machines - Requirements for grass and brush cutting machines

Machines d'exploitation des routes - Sécurité - Partie 4-  
1 : Machines d'entretien des accotements routiers -  
Exigences pour les faucheuses - débroussailluses

Maschinen für den Straßenbetriebsdienst - Sicherheit -  
Teil 4-1: Maschinen für Straßenunterhaltung -  
Anforderungen für Grasmähgeräte

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 151.

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## European foreword

This document (prEN 17106-4-1:2017) has been prepared by Technical Committee CEN/TC 151 “Construction equipment and building material machines - Safety”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13524:2003+A2:2014, EN 13021:2003+A1:2008 and EN 13019:2001+A1:2008.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

When a relevant specific part does not exist, part 1 can help to establish the requirements for the machine, but will not by itself provide a means of conforming to the relevant essential health and safety requirements of the Directive.

EN 17106 consists of the following parts under the general title road operation machinery - Safety:

- Part 1: General requirements
- Part 2: Specific requirements for road surface cleaning machines
- Part 3-1: Winter service machines - Specific requirements for snow clearing machines with rotating tools and snow ploughs
- Part 3-2: Winter service machines - Specific requirements for spreading machines
- Part 4-1: Road service area maintenance machines - Specific requirements for grass and brush cutting machines

**prEN 17106-4-1:2017 (E)****Introduction**

This document is a type C standard as stated in EN ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situation and events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those, which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

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## 1 Scope

This European Standard applies to machines used for road service area maintenance which are attached to or mounted on carrier vehicles (e.g. tractor, truck), or which are self-propelled machinery and which are defined in Clause 3. Directives and standards for the vehicular truck or tractor chassis aspect, termed 'carrier vehicle' in this standard, would be those relevant to that equipment.

For machinery which are a combination of a grass/brush-cutting attachment and a carrier-vehicle, this part of the standard applies to the grass or brush cutting attachment itself and with all health and safety requirements of the interaction and effects between attachment and the carrier vehicle when used together (e.g. stability, visibility).

For self-propelled machinery, this part only deals with health and safety requirements of the attachment itself and does not deal with the self-propelled machinery itself which are dealt with in EN 17106-1.

NOTE 1 Road regulations or Directive apply to vehicular truck and tractor.

NOTE 2 The use in public road traffic is governed by the national regulations.

This European Standard deals with all significant hazards identified through a risk assessment pertinent to road service area maintenance machines, when they are used as intended and under the conditions foreseen by the manufacturer (see Clause 4). This European Standard does not deal with significant hazards associated with EMC. This European Standard specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards associated with machine operation, setting and adjustments, load discharge and routine maintenance.

This European Standard does not include requirements for the carrier vehicles (e.g. trucks, tractors, construction machines, industrial trucks). These are covered in directives related to the construction of vehicles.

This European Standard does not deal with:

- walker-operated and hand-held machines;
- machines for the maintenance of sports grounds;
- machines for agriculture, horticulture and forestry;
- pit and sewer cleaning vehicles/-machines;
- grass and brush cutting machines with multiple cutting heads (see Annex A, Clause C.2, Figure C.20)
- vertical axis grass and brush cutting machines except inter-post machinery (see Annex A, Clause C.2, Figure C.22)
- horizontal axis grass and brush cutting machines with two rotors (see Annex A, Clause C.2, Figure C.23)
- self-propelled remote controlled machinery for road service area maintenance, except the mowing head
- self-propelled remote controlled machinery used for forestry application (see Annex A, Clause C.2, Figure C.21)
- cleansing and ditch maintenance machines (see Annex A, Clause C.2, Figure C.24 and C.25)

**prEN 17106-4-1:2017 (E)**

A machine which is a combination of several parts with different uses should conform to all the standards referring to the corresponding parts of the machine.

This document, together with part 1, deals with all significant hazards for road service area maintenance machines – grass and brush cutting machines when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer associated with the whole life time of the machine (see Clause 4).

The requirements of this part are complementary to the common requirements formulated in prEN 17106-1:2017.

This document does not repeat the requirements from prEN 17106-1:2017, but adds or replaces the requirements for application for grass and brush cutting machines.

This European Standard does not deal with the risks associated with the operation of machines in potentially explosive atmospheres.

This standard applies to machines manufactured after the date of approval of this standard through CEN.

**2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15436-1:2008, *Road service area maintenance equipment - Part 1: Terminology*

prEN 17106-1:2017, *Road operation machinery — Safety — Part 1: General requirements*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)* <https://standards.iteh.ai/catalog/standards/sist/cf40c52c-3f73-4f84-a2f3-9c58f587a59d/osist-pren-17106-4-1-2017>

ISO 536:2012, *Paper and board — Determination of grammage*

ISO 730:2009, *Agricultural wheeled tractors — Rear-mounted three-point linkage — Categories 1N, 1, 2N, 2, 3N, 3, 4N and 4*

ISO 789-1:1990, *Agricultural tractors — Test procedures — Part 1: Power tests for power take-off*

ISO 1974:2012, *Paper — Determination of tearing resistance — Elmendorf method*

ISO 2758:2001, *Paper — Determination of bursting strength*

ISO 3416:1986, *Textile floor coverings — Determination of thickness loss after prolonged, heavy static loading*

ISO 6750:2005, *Earth-moving machinery — Operator's manual — Content and format*

ISO 11001 (all parts), *Agricultural wheeled tractors — Three-point hitch couplers*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, EN 15436-1:2008 and the following apply.

#### 3.1

##### **machine for road service area maintenance**

machine situated at the traffic surface which, from this position, prepares the traffic surface and its neighbouring areas

#### 3.2

##### **grass-cutting machinery**

machine for road service area maintenance specifically designed and manufactured for grass-cutting operations (for example, see Figures C.1, C.2 and C.18 in Annex C)

Note 1 to entry: Grass-cutting machinery can be self-propelled or mounted at rear, front or laterally of a carrier-vehicle.

#### 3.3

##### **brush-cutting machinery**

machine for road service area maintenance specifically designed and manufactured for brush-cutting operations (for example, see Figures C.1, C.2 and C.19 in Annex C)

Note 1 to entry: Brush-cutting machinery can be self-propelled or mounted at rear, front or laterally of a carrier-vehicle.

#### 3.4

##### **grass/brush-cutting machinery (Mixed machinery)**

machine for road service area maintenance specifically designed and manufactured for grass and brush-cutting operations (for example, see Figures C.1, C.2, C.18 and C.19 in Annex C)

Note 1 to entry: Grass/brush-cutting machinery can be self-propelled or mounted at rear, front or laterally of a carrier-vehicle.

#### 3.5

##### **inter-post machinery**

grass-cutting machine specifically designed to remove vegetation around and between posts (see Annex C, Figures C.3 and C.4)

#### 3.6

##### **releasing device**

device ensuring that the equipment is released when encountering an obstacle

#### 3.7

##### **primary control**

manual control designed to operate the machine and which control main functions for frequent use

#### 3.8

##### **secondary control**

device to control the machine functions which need low frequent use

Note 1 to entry: Devices can be monitor or display.

## prEN 17106-4-1:2017 (E)

## 4 List of additional significant hazards

Clause 4 of prEN 17106-1:2017 applies with the following Table 1.

Table 1 of prEN 17106-1:2017 and Table 1 of this document contains all hazards and hazardous situations as far as they are dealt with in this European Standard, identified by risk assessments significant to this type of machinery that require action to eliminate or reduce risk.

**Table 1 — List of additional significant hazards**

	Hazard	Hazardous situation/event	Subclause of EN 17106-4-1
<b>A.1</b>	<b>Mechanical hazards</b>		
A.1.1	Crushing hazard	— Power transmission	5.3, 5.8
		— Working tools	5.3, 5.5, 5.8
A.1.2	Shearing hazard	— Power transmission	5.3, 5.8
		— Working tools	5.3, 5.5, 5.8
A.1.3	Cutting or severing hazard	— Working tools	5.3, 5.8
A.1.4	Entanglement hazard	— Power transmission parts	5.3, 5.8
		— Working tools	5.3, 5.5, 5.8
A.1.5	Drawing-in or trapping hazard	— Power transmission parts	5.3, 5.8
		— Working tools	5.3, 5.5, 5.8
A.1.7	Stabbing or puncture hazard	— Working tools	5.5, 5.8
<b>A.6</b>	<b>Hazards generated by neglecting ergonomic principles in machinery design</b>		
A.6.1	Unhealthy postures or excessive effort	— Controls oSIST prEN 17106-4-1:2017	5.2.3
A.6.2	Inadequate consideration of hand-arm or foot-leg anatomy	— Controls <a href="https://standards.iteh.ai/catalog/standards/sis/cf40c52c-3173-4184-a2f5-9c58f587a59d/osist-pr-en-17106-4-1-2017">https://standards.iteh.ai/catalog/standards/sis/cf40c52c-3173-4184-a2f5-9c58f587a59d/osist-pr-en-17106-4-1-2017</a>	5.2.3
A.6.3	Neglected use of personal protective equipment	— Operator's manual	7
A.6.5	Mental overload and under load, stress	— Controls	5.2.3
A.6.6	Human error, human behaviour	— Controls	5.2.3
		— Operator's manual	7
		— Signs	7
A.6.7	Inadequate design, location or identification manual controls	— Controls	5.2.3
<b>A.7</b>	<b>Combination of hazards</b>		
		— Individual assemblies	5.2.1
		— Operator's manual	7
<b>A.8</b>	<b>Unexpected start-up, unexpected overrun/overspeed</b>		
A.8.1	Failure/disorder of the control system	— Electrical equipment	5.7
A.8.2	Restoration of energy supply after an interruption	— Controls	5.2.3
A.8.4	Other external influences (gravity, wind, etc.)	— Stability	5.2.2
A.8.5	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities)	— Controls	5.2.3
		— Operator's manual	7

	Hazard	Hazardous situation/event	Subclause of EN 17106-4-1
A.9	Impossibility of stopping the machine in the best possible conditions	— Controls	5.2.3
A.11	Failure of power supply	— Supports	5.5
A.13	Errors of fitting	— Operator's manual	7
A.14	Break-up during operation	— Guards and barriers — Supports — Hydraulic components — Pneumatic components	5.6 5.5 5.5 5.5
A.15	Falling or ejected objects or fluids	— Supports — Hydraulic components	5.3, 5.6 5.5
A.16	Loss of stability/overturning of machinery	— Stability	
<b>Additional hazards, hazardous situations and hazardous events due to mobility</b>			
A.18	<b>Related to the travelling function</b>		
A.18.1	Movement when starting the engine	— Starting/stopping the engine	5.7
A.18.2	Moving without a driver at the driving position	— Starting/stopping the engine	5.7
A.19	<b>Link to the work position</b>		
A.19.4	Mechanical hazards at the working position: a) contact with wheels; b) rollover; c) fall of objects, penetration by objects;	— Supports	5.3, 5.5
A.19.5	Insufficient visibility from the work positions	— Visibility	5.2.4
A.20	<b>Due to the control system</b>		
A.20.1	Inadequate location of manual controls	— Controls	5.2.3
A.20.2	Inadequate design of manual controls and their mode of operation	— Controls	5.2.3
A.21	<b>From handling the machine (lack of stability)</b>	— Stability	5.2.2
A.22	<b>Due to the power source and to the transmission of power</b>		
A.22.3	Hazards from coupling and towing	— Mounting of machines	5.4
A.23	<b>From/to third persons</b>		
A.24	Insufficient instructions for the driver/operator	— Operator's manual	7

## prEN 17106-4-1:2017 (E)

## 5 Safety requirements and/or measures

### 5.1 General

Grass and brush cutting machines shall comply with the requirements of prEN 17106-1:2017, as far as not modified or replaced by the requirements of this part.

The machines shall also comply with the health and safety requirements and/or measures of this part.

Where the means of reducing the risk is by a safe system of working the machinery, the manufacturer shall include in the Information for use details of the system and of the elements of training required by the operating personnel.

### 5.2 Combination of carrier vehicle and machine for grass and brush cutting machinery

#### 5.2.1 General

Sub Clause 5.3.1 in part 1 applies with the following addition:

The design of the grass and brush cutting machinery shall conform to the requirements of the carrier vehicle defined by its manufacturer.

#### 5.2.2 Stability

Sub Clause 5.3.4 in part 1 applies with the following addition:

The off-side wheel shall have at least 15 % of the total weight applied on the axle in the most unfavourable configuration, especially for the working position.

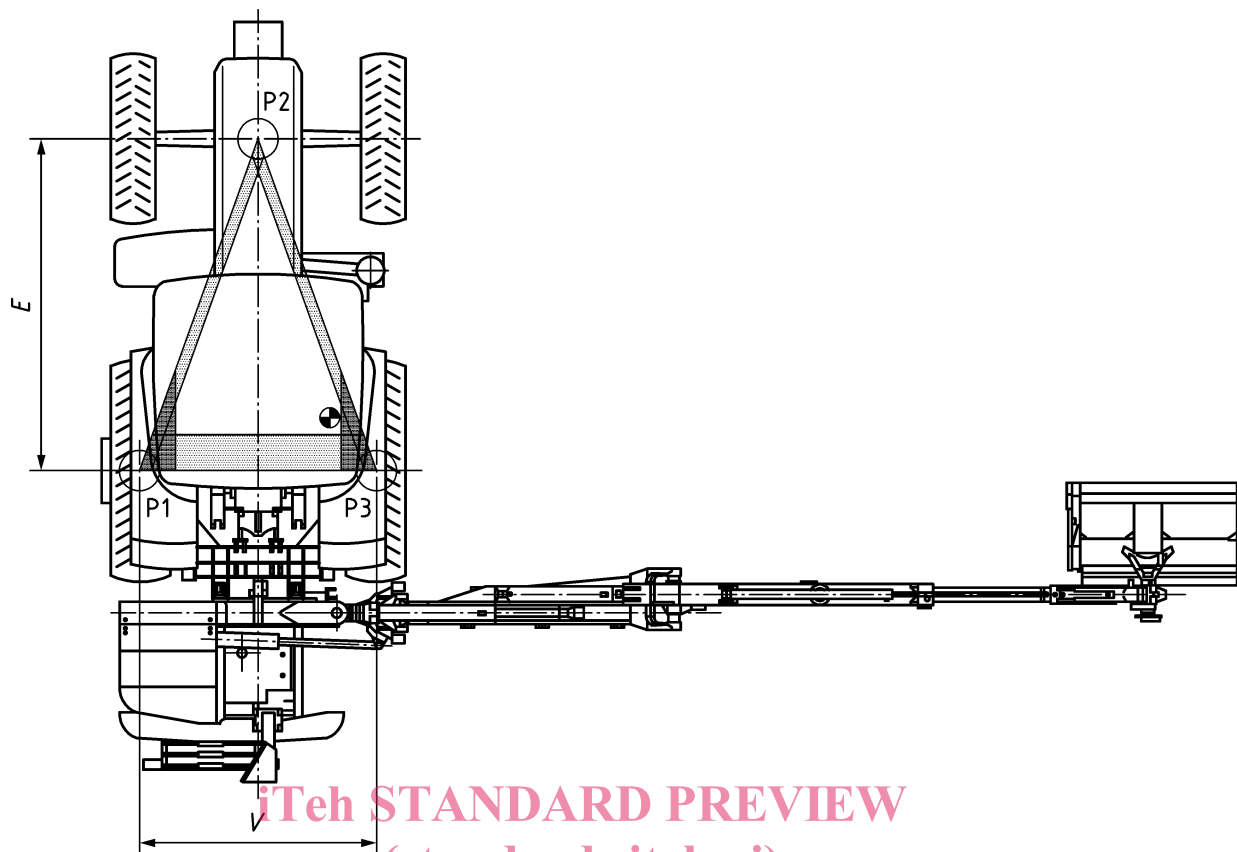
For rear-mounted articulated arm-type machinery, the following requirements apply:

- $P1 + P2 + P3 < \text{Maximum operating mass of the carrier-vehicle (Gross vehicle mass)}$ ;
- $P3 < \text{Maximum Load on rear wheel}$ ;
- $P1 / (P1 + P2 + P3) > \text{Lateral stability coefficient (coeff "zone preferred" chosen 15 \%)}$ ;
- $P2 / (P1 + P2 + P3) > \text{Frontal stability coefficient (coeff "zone preferred" chosen 15 \%)}$ ;
  - $Xg = V * P1 / (P1 + P2 + P3)$ ;
  - $Yg = E * P2 / (P1 + P2 + P3)$ ;
  - $Yg < 2 * E * Xg - Cst$  (Cst linked to diagonal stability coefficient) (coeff "zone preferred" chosen 5 %)

with following parameters:

- P1, P2 and P3: equivalent load applied to the ground;
- V, rear axle track;
- E, wheelbase

and with reference points (x, y) located at right rear wheel



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**Figure 1 — Working position**

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